System Development Charge Methodologies

Appendix C2 Excerpt

(Regional Wastewater System Details)

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System Development Charge Methodology

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partners in wastewater management

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System Development Charge Methodology

Introduction

This document serves as the system development charge (SDC) methodology for the Metropolitan Wastewater Management Commission (MWMC) Regional Wastewater System. The MWMC is the regional wastewater treatment agency for the Eugene-Springfield metropolitan area. System development charges may be collected from all development that connects to the Regional Wastewater System, including development that changes the use of existing development, when the change of use results in a greater impact on the system.

The methodology contained in this document was developed in accordance with Oregon SDC legislation (ORS 223.297-223.314), and with the guidance of a Citizen Advisory Committee (CAC) appointed by MWMC. Table 1 provides a comparison of key methodological requirements from the Oregon Revised Statute (ORS) to elements of the MWMC methodology.

TABLE 1
Summary of Key Methodological Requirements

Oregon Law Requirement	MWMC Methodology
Reimbursement Fee	
Determine that existing capacity exists	Explicitly calculates the portion of existing capacity available to new users based on rated design capacities.
Methodology based on, when applicable: (a) Rate-making principles employed to finance publicly-owned capital improvements (b) Prior contributions by existing users (c) Gift or grants (d) Value of unused capacity or cost of existing facilities (e) Other relevant factors	Methodology includes: (a) Consideration of capital financing costs (b) Adjustment for grant-funded facilities (c) Valuation based on appreciated cost (i.e., adjusted for inflation) (d) Determination of unused capacity
Promote objective of future system users contributing no more than an equitable share of existing system costs	(1) Includes a credit against SDCs for properties subject to past general obligation bond debt service charges through property tax payments. (2) Provides guidance to calculate a credit against SDCs for future estimated user charge payments used to fund debt service associated with projects included on the SDC project list.
Improvement Fee	
Methodology demonstrates consideration of projected costs of capital improvements identified in an adopted plan or list	Provides a structured process for allocation of capital project costs that is to be applied to an adopted project list

TABLE 1
Summary of Key Methodological Requirements

Oregon Law Requirement	MWMC Methodology
Methodology demonstrates consideration of the need for increased capacity in the system to meet future users' demands	Allocates future improvement costs to growth in proportion to capacity requirements
Combined Fee	
Demonstrate that charge is not based on providing the same capacity	Determines total growth capacity requirements and the portion of capacity to be met through existing system available capacity and future capacity expansion. Calculates a weighted average cost of capacity.
Compliance Charge	
Annual accounting of revenue attributed to the costs of complying with the statutes	Includes development of a charge to recover the costs of complying with the provisions of ORS 223.297 to 223.314.

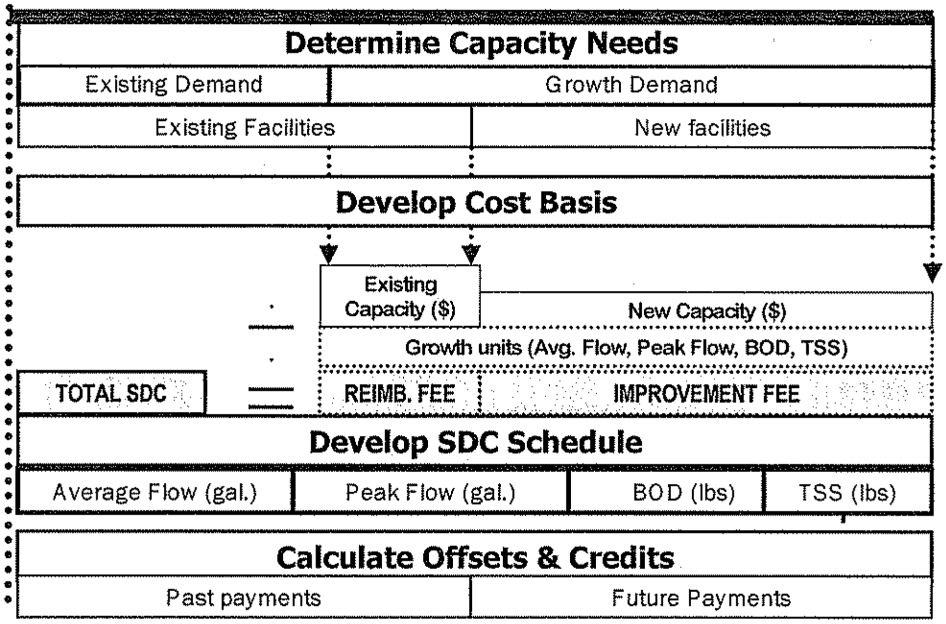
System Development Charge Methodology

Overview

The SDC methodology for MWMC is based on a combined reimbursement and improvement structure, as shown in Figure 1. The methodology consists of the following elements:

- Determine capacity needs
- Develop cost basis
- Develop SDC schedule
- Calculate revenue offsets and credits
- Application of cost index
- Determine compliance charge

FIGURE 1—OVERVIEW OF MWMC SDC METHODOLOGY



The reimbursement fee is based on the value of available capacity in the system that will serve growth. The improvement fee is based on future facility costs associated with providing growth's additional capacity needs (above what is already available in the system). Together, the reimbursement and improvement fees recover costs equal to growth's capacity needs.

Existing system available capacity and future improvement costs needed to expand capacity for growth are distributed to capacity parameters (average flow, peak flow, biochemical oxygen demand [BOD], and total suspended solids [TSS]), and spread over the total growth units projected for the period to determine weighted average reimbursement and improvement unit costs. The SDCs for individual developments are then determined by applying the unit costs (by fee element and capacity parameter) to the individual development estimated capacity requirements, and summing the results. The total SDC for each development is then reduced by any applicable credits for past and future capital payments.

Table 2 provides an example calculation for a single capacity parameter. The numbers included in the table are intended to illustrate the methodology only (when applied to the single capacity parameter of average flow); the numbers do not represent MWMC planning criteria or cost data. Furthermore, the total SDC would include similar calculations for other capacity parameters (i.e., peak flow, BOD, and TSS). In the example provided, total system capacity needs at the end of the planning period are 60 million gallons per day (mgd). Existing users are estimated to require 45 mgd (90 percent) of existing capacity, leaving 5 mgd (10 percent) available for growth. However, growth's total needs are 15 mgd, meaning that additional investment will be required to expand system capacity by 10 mgd.

TABLE 2
Example Calculation for Single (Average Flow) Capacity Parameter*

Element	Total	Existing System	Future Expansion
Determine Capacity Needs			
Systemwide Capacity (mgd)	60	50	10
Existing Users (mgd)	45	45	0
Growth (mgd)	15	5	10
Determine Cost Basis Needs		10%	100%
Systemwide Cost		$50,000,000	$12,000,000
Growth Cost	$17,000,000	$5,000,000	$12,000,000
Determine SDC Schedule			
Weighted Average Unit Cost ($/mgd)	$1,133,333	$333,333	$800,000
User Capacity Requirement (mgd)	0.00035	0.00035	0.00035
Total SDC	$396.67	$116.67	$280.00

*Example only; not MWMC specific

The example reimbursement fee cost basis includes 10 percent ($5 million) of existing system value, associated with providing 5 mgd of capacity. The improvement fee cost basis includes the costs to expand the facilities by 10 mgd, in this case estimated to be $12 million. The total costs allocated to growth are equal to the total capacity required by growth (5 mgd existing +10 mgd expansion) = 15 mgd total.

At this point the SDC schedule can be developed. First, the weighted average unit costs are developed. This is accomplished by dividing the reimbursement fee and improvement fee cost bases by the *total* growth capacity units (15 mgd in this case). By dividing the individual fee elements by the total growth units, the combined fee is based on a weighted average cost per unit. This is demonstrated in Table 2 where the individual unit costs are $333,000 per mgd ($5 million/15 mgd) and $800,000 per mgd ($12 million/15 mgd), respectively, for reimbursement and improvement elements; and $1.1 million per mgd ($17 million/15 mgd) overall. The SDC for a user who requires 350 gallons per day (.000350 mgd) would equal $116.67 reimbursement ($333,333 X 0.000350) + $280 improvement ($800,000 X 0.00035) for a total of $396.67. The same fee would result from using the total cost per unit ($1.13 per gallon per day) multiplied by the 350-gallon-per-day user requirements.

As the example demonstrates, the methodology meets the key requirements of the law, as identified in Table 1:

- Determines the amount of available capacity that exists and allocates costs to growth accordingly.
- Allocates improvement costs to growth in proportion to future capacity needs.

- Does not recover the costs of the same capacity through the reimbursement and improvement fees. Recovers cost associated with existing capacity through the reimbursement fee, and recovers costs associated with new capacity through the improvement fee. The charges to individual developments are based on a weighted average cost of capacity.

Each element of the methodology is discussed in more detail below.

Methodology Element One: Determine Growth Capacity Needs

Oregon SDC law requires explicit analysis of capacity required to serve growth—and demonstration of how those capacity needs will be met through existing and future facilities. Therefore, it is necessary to first determine the appropriate capacity parameter(s), and growth's capacity requirements.

Step One - Capacity Parameters

The appropriate capacity measure relates to the sizing criteria of the wastewater system, and may, to improve equity, require consideration of multiple parameters to assess the impact of the utility's various types of users. As wastewater systems must be sized to meet all of their customers' demands, flows and strength loadings are important sizing criteria. MWMC provides service to a diverse customer base, so consideration of varying flow and load requirements of different customer types is one facet that ensures the equity of the SDCs.

The four capacity measures or parameters used in the methodology are:

- Average flow
- Peak flow
- BOD
- TSS

These parameters are defined as follows:

- **Average Flow**—The average daily flow in the dry season as defined in the National Pollution Discharge Elimination System (NPDES) permit. Because the NPDES permit requires the Eugene-Springfield Water Pollution Control Facility (WPCF) to meet permit discharge limits on a monthly basis, the average flow is presented in terms of dry season maximum month values when discussing "capacity." The dry season maximum month flow includes base flow (customer flow) and the baseline or dry season infiltration and inflow (I/I).

- **Peak Flow**—The peak hour flow in the wet season associated with the 5-year, 24-hour storm event. Peak flow includes average flow and the additional increment of wet weather I/I.

- **Biochemical Oxygen Demand**—The quantity of oxygen used in the biochemical oxidation of organic matter in a specified time and at a specified temperature. BOD is a measurement of wastewater strength.

- **Total Suspended Solids**—Solids in the wastewater that are removable by laboratory filtering and approximate the quantity of solids that are available to be removed from the wastewater through sedimentation. TSS is a measurement of wastewater strength.

Table 3 provides the allocations of existing and future facility process components to the system capacity parameters: average flow, peak flow, BOD, and TSS. A description of process components is provided in Appendix A. The rationale for the allocation percentages is provided in Appendix B. These allocations are used to determine the projected costs of capacity to be used by new development that establish the reimbursement fee and improvement fee cost bases. The underlying approach is to evaluate the following criteria for each facility process component:

- Functional performance
- Design basis

The functional performance criterion considers the actual purpose of the facility on a daily basis. Is the purpose of the facility to remove BOD or TSS from the wastewater? Or is the purpose of the facility to simply pass the flow (average and/or peak) and remove some other parameter not represented by BOD or TSS such as screenings, grit, or pathogens? These questions are answered by the functional performance component. The design basis considers what system capacity parameter or combination of parameters drives the sizing of the facility and, therefore, the constructed cost. The allocation basis for each facility component presented in Table 3 combines both the functional performance and design basis considerations. In addition to these system parameters, because there can be projects that provide overall support for the wastewater system, a separate category of "indirect" support facilities is used to provide for reallocation of these support-type costs across all of the system capacity parameters.

TABLE 3
Summary of Facility Process Component Allocation to System Capacity Parameters

	System Capacity Parameter					
Facility Process Component	**Average Flow**	**Peak Flow**	**BOD**	**TSS**	**Indirect**	**Total**
Collection system pipeline	¼	¾	--	--	--	1
Collection system pump stations	¼	¾	--	--	--	1
Preliminary treatment	¼	¾	--	--	--	1
Primary treatment	¼	--	¼	½	--	1
Secondary treatment	¼	--	½	¼	--	1
Disinfection/outfall	¼	¾	--	--	--	1
Biosolids (same for all three subcomponents)	--	--	½	½	--	1
Tertiary filters	¼	--	¼	½	--	1
Reuse facilities	1	--	--	--	--	1
Odor control	--	--	½	½	--	1
Peak flow management	--	1	--	--	--	1
Support facilities (Indirects)	--	--	--	--	1	1

Step Two - Growth Capacity Requirements

In developing SDCs, costs related to growth (see 'Cost Basis' below) are spread over growth's total capacity requirements over the study period to determine the overall cost per unit of growth by capacity measure. The study period is defined as a 20-year period, consistent with facility planning requirements. The Department of Environmental Quality (DEQ) stipulates that entities that own and operate wastewater facilities assume a 20-year planning horizon when developing facility plans (see DEQ Guidance for Development of Wastewater Facilities Plans, 2000).

To determine the capacity required by growth, the capacity required by existing users is subtracted from the capacity projected in the facility plan to be required at the end of the planning period. For peak flow estimates, existing users' current capacity requirements are adjusted for anticipated I/I reductions (see Guidelines for the Preparation of Facilities Plans and Environmental Reports for Community Wastewater Projects, 1999).

Methodology Element Two: Develop Cost Basis

The cost basis represents the total costs that the SDCs are intended to recover. The following methodological issues were addressed in developing the reimbursement and improvement fee cost bases:

- **Existing System Valuation (Reimbursement Fee)** – The method for valuing existing facilities with capacity to serve growth.
- **Existing System Allocation (Reimbursement Fee)** – The method for allocating existing system facility value to growth.
- **Project Cost Valuation (Improvement Fee)** - The method for valuing future projects.
- **Project Cost Allocation (Improvement Fee)** – The method for allocating future projects to growth.
- **Adjustments** – Deductions or additions to the cost basis to recognize past or future capital funding methods.

Each issue is discussed below.

Step One - Existing System Valuation

Calculation of the reimbursement fee begins with a review of MWMC's fixed asset records to determine the value of the existing system. The system is valued based on the inflation adjusted original cost approach. Under this approach, the original cost of existing system assets is adjusted by the *Engineering News-Record* national 20-city average Construction Cost Index from the time of construction to estimate current values. The inflation adjusted cost approach recognizes appreciation in the system since assets were constructed and assumes that the wastewater system is maintained in perpetuity.

Step Two - Existing System Allocation

The existing system allocation methodology, for use in determining the reimbursement fee cost basis, is a three-step allocation process[1] comprised of the following steps, as illustrated in Figure 2:

R-1. Allocate existing facility costs to facility process components (e.g., primary treatment, secondary treatment).

R-2. Allocate costs by component to system capacity parameters (e.g., average flow, peak flow).

R-3. Allocate costs to growth based on estimated available capacity by service parameter.

The allocation of existing facility costs to facility process components is fairly straightforward, as most projects relate directly to an individual component (e.g., secondary clarifiers are a part of secondary treatment), or support the entire treatment system (e.g., control systems). Existing facility costs (valued in terms of inflation-adjusted costs) by process component are then allocated to capacity parameters based on the allocation fractions in Table 3.

The final step in the allocation process is to multiply the costs by capacity parameter by the percent of capacity available by parameter. To determine the available capacity for a parameter, the amount of capacity that is currently being used (or required for existing users) is subtracted from the current rated capacity. If the current capacity requirement is equal to or greater than the existing capacity, then there is no available capacity, and none of the costs related to that parameter is included in the reimbursement fee cost basis. Table 4 shows existing system available capacity by parameter based on system planning criteria. The documentation for these figures is provided in Appendix C.

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[1] The numbering of the steps for the existing system allocation process is preceded by an "R" to identify these steps as relating to the Reimbursement Fee calculation. Later processes relating to the Improvement Fee calculation are indicated by an "I" in the number sequence.

FIGURE 2—EXISTING SYSTEM ALLOCATION

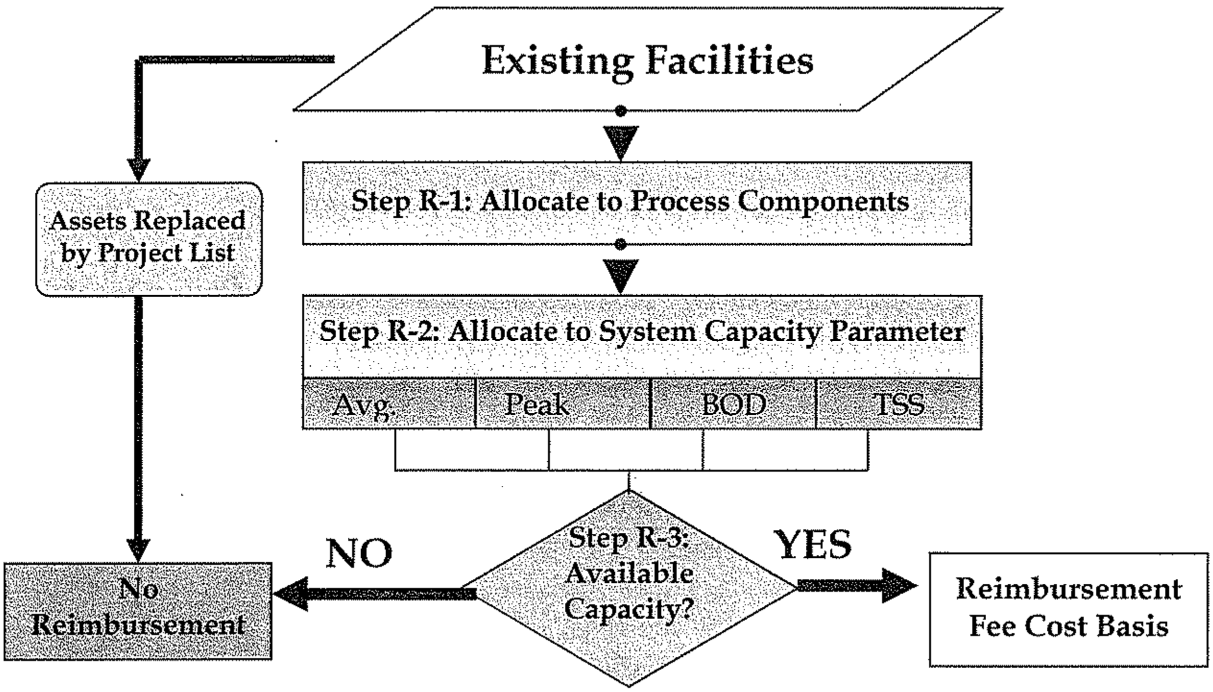


TABLE 4
Existing System Available Capacity by Parameter

Variable	Average Flow (mgd)	Peak Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)
Existing capacity	49.0	175	66,000	71,600
Current loading (current capacity required)	43.8	264	54,800	64,700
Available capacity (value)	5.2	None	11,200	6,900
Available capacity (%)	10.5%	0%	17%	9.6%

Source: 2004 Facilities Plan

Step Three – Project Valuation

Calculation of the improvement fee begins with a review of MWMC's adopted 20-Year Project List to determine the value of future projects. Project values are updated regularly to reflect: 1) annual inflation for projects,:, as estimated by applying the *Engineering News Record* national 20 city average Construction Cost Index to the original project estimate, and 2) actual costs for any bond-funded projects.

Step Four - Project Cost Allocation

The project cost allocation methodology, for use in determining the improvement fee cost basis, is a four-step allocation process consisting of the following steps:

I-1. Allocate project costs to facility process components (e.g., primary treatment, secondary treatment).

I-2. Allocate costs by components to system capacity parameters (e.g., average flow, peak flow).

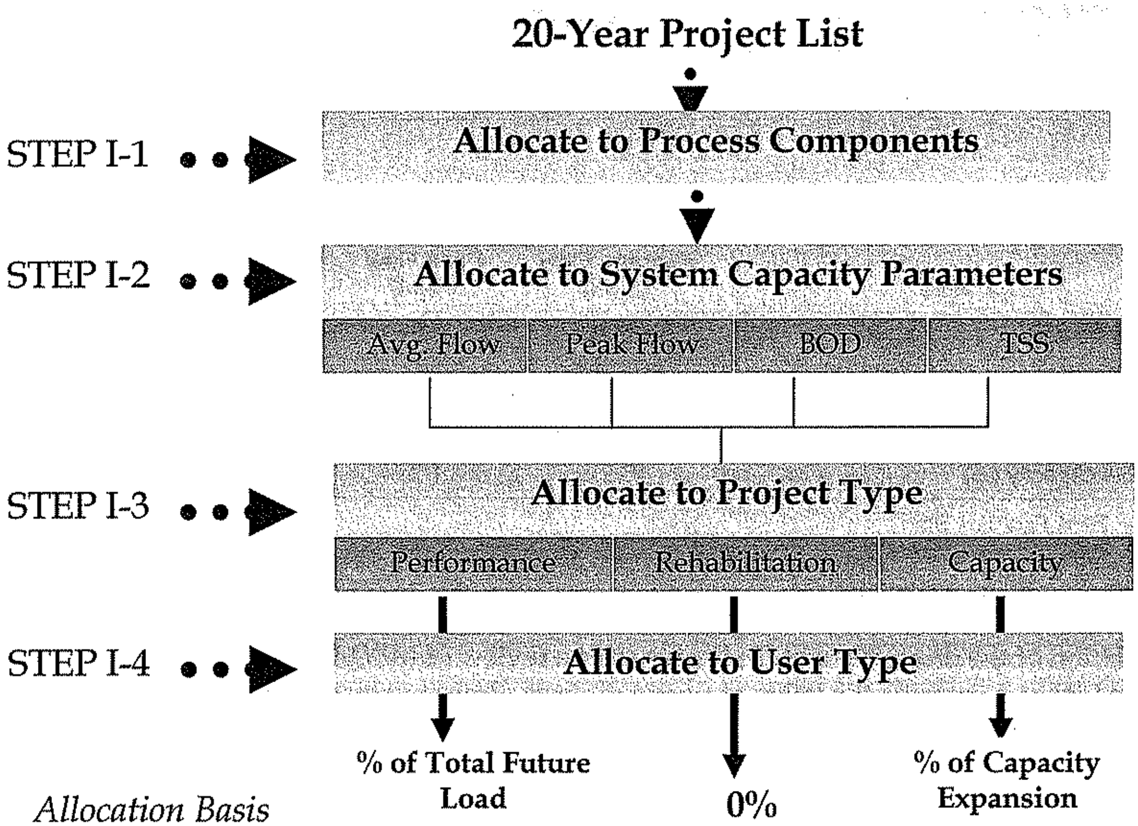
I-3. Allocate project costs to type (capacity improvement, performance upgrade, or rehabilitation).

I-4. Allocate costs to user type (existing customers or projected growth).

The project cost allocation methodology provides an equitable basis for determining the projects or portions of projects that are related to growth capacity needs and are, thereby, included in the improvement fee portion of the SDC calculation. The methodology is not tied to a specific list of projects intended to be funded by SDCs (20-year project list), but is intended to provide a consistent framework for allocation of future projects to growth.

Each step of the methodology is described below. The general allocation process is also presented graphically in Figure 3.

FIGURE 3—PROJECT COST ALLCOATION



The allocation of future projects to facility process components is generally fairly straightforward, as most projects relate directly to an individual component or support the entire treatment system. The refinement of the facility component allocation process for MWMC relates to recognition of peak flow management costs. While it is likely that future project lists will include projects entirely related to peak flow management, it is also likely that portions of projects relating to various aspects of the treatment process (e.g., secondary treatment) will also play a role in future peak flow management.

The following question needs to be answered when allocating project costs to facility components: "Which specific facility component does the project expand or improve?" If the project expands or improves more than one facility component, then project costs should be apportioned relative to the expansion or improvement of each applicable component.

The allocation fractions from Table 3 are used to distribute costs by facility component to capacity parameter, as was done for the existing system cost allocations. The basis for these allocations is described in Appendix B.

Step I-3 of the project cost allocation methodology is to allocate costs to project types. The three project types, which are intended to be representative of the complete project list, are:

1. **Capacity**—Projects or portions of projects that are related to increasing liquids and/or biosolids conveyance, treatment, and disposition capacity beyond existing design standards (i.e., projects that provide the next capacity increment within the planning period).
2. **Performance Improvements**—Projects that increase system capacity by increasing the level of performance provided by facilities. Unlike 'capacity' projects that relate only to the next increment of capacity, performance upgrades are generally sized based on total projected capacity needs at the end of the planning period (existing and future).
3. **Rehabilitation**—Projects designed to remedy an existing system deficiency and do not enhance system capacity.

Capacity and performance upgrade projects can be new facilities, or upgrade/expansion of existing facilities. Rehabilitation projects are the replacement of outdated or worn out equipment or facilities.

The majority of the projects will typically fall completely into one project type. However, some projects may be split between capacity and performance types. The general criteria for allocating projects to the above categories are shown in Table 5. These criteria should be applied in the development of specific projects for inclusion in the appropriate planning document or project list and should be considered and evaluated as part of the process of adoption of such a plan or project list.

TABLE 5
Summary of Project Type Allocation Criteria

Project Type	Potential Criteria
Capacity	Adds new facilities/expands existing facilities
	Provides new liquids treatment or biosolids capacity beyond existing system design standard or beyond the current permitted capacity
Performance Improvements	Adds new facilities/improves existing facilities
	Provides capacity/enhanced capability sized for total future capacity needs
	Driven by new regulatory requirement
	Driven by increase in community performance standard
	Technological efficiencies
Rehabilitation	Replaces existing facility or portion of facility
	Does not serve growth either through existing available or new capacity
	Preserves existing facility performance/capacity

Once project costs have been allocated to system component and project type categories, and the costs have been distributed to the system capacity parameters, the final step in the project cost allocation process is to assign costs to user types. For the purposes of the SDC methodology, there are two user types: 1) existing customers, and 2) new customers or growth. Costs that are allocated to growth are incorporated into the SDC improvement fee calculation. Costs allocated to existing customers must be paid through some other funding sources (e.g., existing reserves or future user rates).

As indicated in Figure 3, the allocation of project costs to growth is a function of the type of project and a detailed capacity analysis that identifies growth's share of: 1) planned capacity expansion, and 2) total future load.

Costs by capacity parameter are allocated to growth as follows:

Capacity Projects: Growth's share of capacity expansion (%) X project cost ($)

Performance Upgrades: Growth's share of total future system capacity (%) X project cost ($)

Rehabilitation Projects: Allocation to growth = 0%

Where:

1. Growth's share of capacity expansion = Projected growth capacity requirement (not met by existing available capacity) divided by *additional* capacity to be added to the system by planned improvements.
2. Growth's share of total future system capacity = Projected growth capacity requirement (total) divided by *total future* system capacity requirement.

Table 6 summarizes the growth allocation percentages by project type. The documentation for these figures is provided in Appendix C.

TABLE 6
Growth Allocation Percentages by Project Type

Project Type	Average Flow	Peak Flow	BOD	TSS
Capacity (growth's share of capacity expansion)	100%	29.4%	100%	100%
Performance (growths share of total future system capacity)	26.1%	10.8%	25.9%	26.1%
Rehabilitation	0%	0%	0%	0%

Source: 2004 Facilities Plan

Step Four - Adjustments

The methodology includes the following adjustments to the reimbursement and improvement fee cost bases:

- **Gifts or grants from federal or state government or private persons.** Existing (and if applicable in the future, planned) asset costs are reduced by the percent of the asset that is funded by grants.
- **Ratemaking principles employed to finance the capital improvements.** Projected capital financing costs are added to the project costs if the project is funded through debt proceeds. Future years' interest expense is discounted to present value using a 5% discount rate.

Methodology Element Three: Develop SDC Schedule

Unit costs for each capacity parameter are determined by dividing the adjusted cost basis by the projected growth capacity requirements. The unit costs are then multiplied by the estimated capacity requirements of different types of users, as determined from MWMC's Industrial Pretreatment Program. Figure 4 illustrates this process.

FIGURE 4—SDC SCHEDULE DEVELOPMENT

This approach uses flow and strength assumptions that are consistent with the system capacity parameters described previously. For example, average flow is defined as dry season maximum month flow. This capacity measure is used in estimating user capacity requirements. The peak-to-average flow ratio reflects the system planning assumptions. The flow assumptions for various land uses (development types) are presented in Appendix D. If information for a particular development is not found in Appendix D, the SDC will be formulated using average data of like or similar development as determined by the City Engineer. Strength assumptions for different development types are estimated by MWMC's Industrial Pretreatment Program.

Unit Costs		Capacity Requirement /		SDC / Unit
Avg. Flow $/mgd	X	Avg. Flow mgd/unit	=	Avg. Flow $/unit
Peak Flow $/mgd	X	Peak Flow mgd/unit	=	Peak Flow $/unit
BOD $/lb	X	BOD lbs/unit	=	BOD $/unit
TSS $/lb	X	TSS lbs/unit	=	TSS $/unit

Methodology Element Four: Calculate Revenue Offsets and Credits

To comply with Oregon SDC law, the SDC methodology must ensure that future system users contribute no more than an "equitable share" of the capital costs of existing facilities. Before real property is developed, it may have been subject to taxes that supported capital funding of some of the Regional Wastewater System. After a development connects to the system, it will pay rates and, possibly taxes as well, that may also support some level of capital funding. The SDC methodology therefore considers past and future payments to be made by new developments, which may partially fund the same facilities for which the SDCs were paid.

Past Payments

A portion of MWMC's existing facility costs were funded through general obligation (GO) bonds. The debt service on the bonds was retired through property taxes. Undeveloped land in the cities of Eugene and Springfield was subject to property taxes, and therefore a GO bond credit is included in the methodology. The credit is equal to the present value of past payments on bond principal, expressed in dollars per $1,000 of assessed valuation. The credit shall accrue from the year of annexation, and be based upon the assessed value of the real property at the time of application for connection to the system.

Appendix E shows the calculation of the GO bond credit.

Future Payments

At the time of adoption of the project list upon which SDCs are to be based, or any periodic modification to such list, a credit against the SDCs will be calculated. The credit will reflect the present value of future contributions (through user fees) by new development to the repayment of debt service for the cost of capital improvements that benefit existing customers.. The credit analysis is structured as follows:

1. Debt services costs attributable to projects on the SDC project list are allocated between growth and existing users, based on the projects funded with the debt proceeds.
2. Future user fee billing units (average flow and pounds of BOD and TSS) are estimated for each year of the planning period based on system planning criteria
3. The annual user rate supported debt service per billing unit is determined by dividing the existing users' share of debt service payable each year from user fees (from Step 1) by the annual billing units estimated for each year (from Step 2), over the life of the debt.
4. The present value of the future stream of rate payments is determined for each year of the planning period to determine the credit amount per unit of capacity.

Methodology Element Five: Periodic modification of existing sytem and future project values

The value of existing available capacity and future available capacity may be adjusted from time to time as stated in Methodology Element Two: Step One and Step Three.

Methodology Element Six: Compliance Charge

A charge is included for the costs of complying with the provisions of ORS 223.297 to 223.314, including:

- Legal costs (both litigation costs and annual routine legal fees)
- Annual Accounting/auditing costs
- Annual reporting costs
- SDC methodology development costs

In developing the compliance charge, the total costs associated with SDC compliance activities are projected for the planning period. The costs are then attributed to the capacity parameters in proportion to the combined reimbursement and improvement costs. As with the improvement and reimbursement fees, the costs by parameter are then divided by the number of growth units projected for the planning period in order to determine a compliance cost per unit of capacity.

Appendices

System Component Definitions

The below facility process components were selected because they represent existing distinct processes/components, as well as new processes/components anticipated in the future (e.g., tertiary filters and effluent reuse). These facility components also relate differently to system capacity parameters (discussed in Methodology Element Two), so the initial allocation of project costs to facility components facilitates the next step of allocating costs to capacity parameters, and ultimately to user type. As regulatory requirements change in the future, MWMC should review the facility component categories, and update as appropriate.

Collection System Pipeline—The pipelines owned and operated by MWMC that collect sewage from individual customers and deliver it to the treatment plant.

Collection System Pump Stations—MWMC pump stations that impart energy into the wastewater so that it flows through the collection system pipes or is lifted to a higher elevation. The influent screw pumps at the Eugene/Springfield Water Pollution Control Facility (WPCF) are included in this component.

Preliminary Treatment—Screenings and grit removal facilities. Preliminary treatment facilities are sometimes referred to as headworks facilities because they are located at the front or head end of treatment plants.

Primary Treatment—The sedimentation process intended to remove suspended solids from the wastewater. This component includes the primary sedimentation settling tanks and associated pumping systems for material that is removed from the top (scum/skimmings) and bottom (primary sludge) of the settling tanks.

Secondary Treatment—A biological process to remove the soluble and colloidal organic matter that remains after primary treatment. Facilities typically include aeration basins and the associated blowers that provide air to the basins, and secondary clarification settling tanks and the associated pumping facilities that transport the settled biological sludge to subsequent biosolids processing facilities.

Disinfection/Outfall—Process elements at the downstream end of the treatment process. Disinfection kills or inactivates remaining pathogens contained in the treated wastewater, and the outfall conveys the treated wastewater to the Willamette River where it can be distributed through a diffuser in an environmentally sound manner.

Biosolids—Management and disposal of the organic and inorganic suspended solids that have been removed from the wastewater through the treatment processes. This facility component is divided into three subcomponents because of differences in available and future required capacity. The three subcomponents are as follows:

- *General*—The general subcomponent consists of biosolids thickening and anaerobic digestion at the WPCF; the biosolids pump station/force main system that conveys digested biosolids from the WPCF to the Biosolids Management Facility (BMF); and facultative sludge storage lagoons and drying beds at the remote BMF. The majority of the infrastructure associated with this "General" subcomponent were constructed in the 1980s and early 1990s.

- *Dewatering* – MWMC-installed mechanical biosolids dewatering at the remote BMF for the purpose of removing water from the biosolids so that the remaining biosolids volume is reduced. This dewatering facility was designed to accommodate 7,000 dry tons of biosolids on an annual average basis.
- *Biocycle Farm* – MWMC is in the process of expanding the capability of the biosolids management program by constructing a poplar plantation or biocycle farm (BF) that can accept non-dewatered biosolids, therefore limiting dependence on the cooperative farms land application program that typically uses dewatered biosolids.

Tertiary Filters – Filters to remove TSS and to a lesser degree BOD/ammonia from the secondary effluent.

Reuse Facilities – These facilities enable reuse of effluent and include UV disinfection; pumping of filtered, disinfected effluent; pipelines to convey the water to the end use site; and irrigation distribution/application systems.

Odor Control – Facilities that collect and treat odorous air generated by the treatment of wastewater and biosolids.

Peak Flow Management – A new facility component that functions to convey, treat, and discharge wet season peak flow (based on the 5-year, 24-hour rainfall event). Facilities must be provided so that the peak flow can reach and pass through the WPCF without overtopping structures so that untreated/partially treated sewage does not spill onto the ground and/or into waterways.

Support Facilities (Indirects) – These facilities serve MWMC's overall mission as opposed to one specific facility component. Examples include control systems, civil infrastructure such as roads within the WPCF site, and equipment storage facilities.

APPENDIX B

Capacity Parameter Allocation Basis

System Capacity Parameters are based on permitting requirements. Facility process components (defined in Appendix A) are allocated to each of the system capacity parameters, as described below.

Collection System Pipelines

This category consists of major gravity sewer pipelines and force mains (pressure lines) that convey flow for the regional wastewater collection system. Since the primary function of the pipelines is to convey flow, the allocation is assigned to either average or peak flow and none to wastewater strength parameters (i.e., BOD and TSS). The majority of the time the conveyance system is carrying average flows. However, the limiting design criteria when sizing pipelines is based on peak flows.

An assessment of the wet season I/I, which is the key driver in determining the peak flows, can be used as a guide in determining the average/peak allocation breakdown. Table B-1 presents the wet season I/I as a percentage of total peak flow for existing capacity, current loading, and future required capacity.

TABLE B-1
Design Criteria Basis For Unit Processes Driven By Peak Flow

	Average Flow (mgd)	Wet Weather I/I (mgd)	Total Peak Flow (mgd)	Wet Weather I/I as a Percentage of Total Peak Flow, %
Existing capacity	49	126	175	72%
Current loading (current capacity required)	43.8	220.2	264	83%
Projected 2025 loading (future capacity required)	59.3	218.7[a]	277	79%

Notes:
a) Net reduction in total I/I occurs between now and 2025 as a result of I/I reduction efforts by the cities.

The range of wet weather I/I as a percentage of total peak flow for these three scenarios ranges from 72 to 84 percent. The arithmetic average of these three values is 78 percent. Therefore, a reasonable approach is to allocate a quarter to functional use basis, or average flow; and three quarters to the design criteria sizing basis, or peak flow.

- Average Flow – 1/4
- Peak Flow – 3/4

Collection System Pump Stations

The category collection system pump stations consist of pump stations that impart additional head or pressure to the wastewater so that the flow is conveyed to the WPCF. An example of such a facility is the Wilakenzie Pump Station. These regional pump stations have the same functional and design criteria basis as the regional collection system pipelines, and, therefore, the allocations are:

- Average Flow - 1/4
- Peak Flow - 3/4

Preliminary Treatment

Preliminary treatment facilities are located between the pump stations and primary treatment, consisting of screenings and grit removal facilities. Minimal organic matter (BOD) is removed during preliminary treatment. Also, solid materials removed during preliminary treatment tend to be large and heavy in nature; these materials are not typically considered a "suspended" material (or TSS). Consequently, the loading parameters of BOD and TSS generally do not apply to preliminary treatment, and the unit process category is entirely flow based. The functional and design criteria basis for preliminary treatment are very similar to that of the collection system facilities, and, therefore, the allocation is identical to the preceding categories. The split between average and peak flow is as follows:

- Average Flow - 1/4
- Peak Flow - 3/4

Primary Treatment

Primary treatment consists of the four, large, circular concrete basins (primary clarifiers) and the associated equipment used to remove solids that settle to the bottom of the basins. The purpose of primary treatment from a functional basis is to remove TSS and to a lesser degree BOD. Typical percent removal across primary treatment for TSS and BOD are 60 and 30 percent, respectively. In other words, twice as much TSS is removed relative to BOD.

For the design criteria basis, typical primary clarifiers sizing is governed by both average and peak flow, but for MWMC, where the parallel primary/secondary approach is proposed for peak flow management, the peak flow will be split between primary treatment and secondary treatment. Likewise, if the high-rate clarification peak flow management is ultimately implemented (because regulatory approval is not obtained for the parallel primary/secondary approach), the peak flow will be split between the primary treatment and the high-rate clarification. Therefore, only average flow is considered in the cost allocation.

Combining the functional basis with the design criteria basis, the following allocation is for primary treatment:

- Average Flow - 1/4
- BOD - 1/4
- TSS - 1/2

Secondary Treatment

Secondary treatment consists of two trains of aeration basins, eight secondary clarifiers, and the associated blowers and pumps that function to treat and remove organic loading (BOD) and to a lesser extent TSS from the wastewater. On a functional basis, secondary treatment is regarded as removing roughly twice as much BOD relative to TSS.

For the design criteria basis, typical secondary treatment sizing is governed by both average and peak flow, but for MWMC, where the parallel primary/secondary approach (or high-rate clarification approach as a second choice) is proposed for peak flow management, the peak flows will be split between primary treatment and secondary treatment. Therefore, only average flow is considered in the cost allocation.

Combining the functional basis with the design criteria basis, the following allocation is for secondary treatment:

- Average Flow - 1/4
- BOD - 1/2
- TSS - 1/4

Disinfection/Outfall

Following secondary treatment, the wastewater is disinfected (chlorinated and dechlorinated) and discharged to the Willamette River through an outfall pipe. Both the function and sizing of these facilities are entirely based on flow. The relationship between the functional basis and design criteria is identical to that for the collection system facilities and, therefore, the following allocation is for disinfection/outfall:

- Average Flow - 1/4
- Peak Flow - 3/4

Biosolids

Biosolids are a byproduct of wastewater treatment and are produced during the primary treatment, secondary treatment, and to a lesser degree tertiary treatment processes. The three subcomponents used to allocate biosolids treatment, handling, and disposal/reuse costs for purposes of SDC calculations are:

- General
- Dewatering
- Biocycle Farm

The definitions of these subcomponents are presented in Appendix C, Growth Capacity Allocation Documentation. The three subcomponents were developed for the SDC update because of the differing available capacities and growth percentages associated with facilities in the subcomponents. However, in terms of allocating the facility components to the wastewater parameters, the methodology is identical—independent of which subcomponent is being considered.

Biosolids facilities at the WPCF and the BMF are both sized and function to treat the BOD and TSS removed during the treatment process; therefore, their allocation is split equally between BOD and TSS.

- BOD - 1/2
- TSS - 1/2

Tertiary Filters

The existing WPCF does not have tertiary filters. The 20-year project list recommends that tertiary filters be installed to enable the WPCF to consistently meet the NPDES permit discharge requirements. The permit includes mass limits for BOD and TSS. As influent flows to the WPCF increase in the future, the effluent concentration required to meet the mass limits decreases. Addition of the filters will assist with meeting these more stringent effluent concentrations. From a functional basis, the main purpose of the filters is to remove TSS, and to a lesser degree BOD. From a design criteria sizing basis, average flow is used to determine the size of the facilities. In the wet weather season, a portion of the peak flow may be routed to the filters for additional treatment. However, the associated peak flow loading rate onto the filters will not be the limiting factor in terms of design criteria sizing. Following is the allocation for the tertiary filter treatment category:

- Average Flow - 1/4
- BOD - 1/4
- TSS - 1/2

Reuse Facilities

Reuse facilities may be constructed to comply with more stringent regulatory requirements related to temperature and/or thermal load restrictions of Willamette River discharges. Reuse facilities would allow flow to be diverted from the river by reusing plant effluent for irrigation. The basic design criterion used to size reuse facilities is average flow; so this parameter receives 100 percent of the allocation.

- Average Flow - 100 percent

Odor Control

Odor control facilities function by collecting odorous air from preliminary/primary liquids treatment processes and biosolids treatment/handling processes and treating the air to remove the odors. Odor generation is dependent on the influent loading levels and, therefore, the allocation is split equally between BOD and TSS because both parameters contribute to the sizing and function of the odor control systems.

- BOD - 1/2
- TSS - 1/2

Peak Flow Management

There are a number of future capital improvement projects that specifically function to convey, treat, and discharge the wet season peak flow. For example, the parallel primary/secondary peak flow management approach is proposed solely to address peak flows. Also, there are facilities such as the dry weather headworks where a portion of their function or design criteria sizing is based on peak flow.

The peak flow management category is allocated entirely to peak flow, as both the ongoing function and the sizing design criteria sizing are based solely on peak flow.

- Peak Flow - 100 percent

Support Facilities (Indirects)

The support facilities or indirect category captures certain types of treatment plant facilities that serve multiple functions, such as the laboratory, land acquisition, and instrumentation and control systems. Costs of these types of facilities are allocated across the other 11 components in proportion to the weighted average allocation percentages. For the reimbursement fee, the weighted average reflects the direct allocation of existing asset costs to the 11 facility components. For the improvement fee, the weighted average reflects the allocation of the 20-year project list to the 11 facility components.

- Support facilities allocated proportionally to the other 11 facility components.

APPENDIX C

Growth Capacity Allocation Documentation

Liquids Treatment

A summary of the MWMC liquids treatment capacity is presented in Table C-1.

TABLE C-1
Capacity Summary of MWMC Liquids Facilities

	Population	Average Flow (mgd)	Peak Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)
Existing capacity	--	49	175	66,000	71,600
Current loading (current capacity required)	217,737	43.8	264	54,800	64,700
Available capacity (value)	--	5.2	None	11,200	6,900
Available capacity (%)		**10.5%**	**0%**	**17.0%**	**9.6%**
Projected 2025 loading (future capacity required)	297,585	59	277	74,000	87,600
Growth loading	79,848	15.5	30[a]	19,200	22,900
Required Capacity Expansion		10	102	8,000	16,000
Growth share of 2025 load	**26.8**	**26.1%**	**10.8%**	**25.9%**	**26.1%**
Growth share of capacity expansion	**100%**	**100%**	**29.4%**	**100%**	**100%**

Notes:
[A] The 30-mgd peak flow attributed to growth consists of 15.5 mgd of average flow and 14.5 mgd of wet season I/I flow. See the following discussion for a detailed derivation of these values.

The rationale for these values is presented in the following paragraphs.

Average Flow

The existing capacity is stated in the current NPDES permit as 49 mgd that represents the dry season design rating for the WPCF. The current loading or current required capacity is 43.8 mgd (presented in DSMM terms). The DSMM value is used to compare to the dry season design rating of the WPCF because the NPDES discharge permit stipulates that the WPCF meet monthly average permit requirements. Therefore, discharge permit requirements must be met on a dry season, maximum-month influent condition. This 43.8-mgd value is determined as follows:

Current average flow (presented as DSMM) = ((129 x 217,737 x 1.5)/1,000,000) + 1. 7_i = 43.8

Where:

- 129 is the average gallons per capita per day (gpcd) of the dry season values from 1990 to 2002
- 217,737 is the population served in 2002
- 1.5 is the selected peaking factor to convert average dry season flow to maximum month dry season flow (based on 1990 to 2002 data)
- 1.7_i is the current industrial flow in mgd

The available capacity in terms of average flow is 5.2 mgd (49 – 43.8).

The projected 2025 average flow is determined as follows:

Projected 2025 average flow (presented DSMM) = ((129 x 297,585 x 1.5)/1,000,000) + 1. 7 = 59.3 mgd

Where:

- 129 is the average gpcd of the dry season values from 1990 to 2002
- 297,585 is the projected population to be served in 2025
- 1.5 is the selected peaking factor to convert average dry season flow to maximum month dry season flow (based on 1990 to 2002 data)
- 1.7 is the projected industrial flow in mgd (it has been assumed that the industrial flow will remain constant over the study period)

The total required capacity to meet the needs of growth in terms of average flow is 15.5 mgd (59.3 – 43.8).

Peak Flow

A summary of the peak flow breakdown is presented in Table C-2. The existing capacity in terms of peak flow is not defined in the NPDES permit, but the plant was originally designed for a peak flow of 175 mgd, and therefore that is defined as the existing capacity. MWMC does not currently have the collection and treatment capabilities to accommodate the existing peak flow (which is greater than 175 mgd), and therefore the current peak flow loading (required capacity) cannot be explicitly measured at the WPCF. Using a computer model of the collection system MWMC is able to estimate the current peak flow. DEQ defines the peak flow as the peak hour or peak instantaneous flow that occurs during the 5-year, 24-hour storm (3.9 inches of rainfall). Under these rainfall conditions, the model predicts a current flow of 264 mgd. Therefore, there is no available capacity in terms of peak flow. Since the current average flow is 43.8 mgd, the current wet season I/I is 220.2 mgd (264 less 43.8).

Using the projected future 2025 population and land use, the model predicts peak flows of 294 mgd without I/I reduction efforts outlined in the 2000 WWFMP and 277 mgd with I/I reduction efforts outlined in the 2000 WWFMP. Therefore, it is estimated that the I/I reduction efforts will reduce I/I by approximately 17 mgd.

Wet season I/I in 2025 attributed to existing users is determined by subtracting the anticipated reduction in wet season I/I (17 mgd) from the current wet season I/I (220.2 mgd) yielding 203.2 mgd.

Finally, wet season I/I attributed to growth in 2025 is 14.5 mgd and is determined by taking the 2025 total peak flow projection of 277 mgd and subtracting both the 2025 average flow (59.3 mgd) and the 2025 wet season I/I attributed to existing users (203.2 mgd). Therefore, the peak flow in 2025 attributed to growth is 30 mgd (15.5 mgd of average flow plus 14.5 of wet season I/I flow).

TABLE C-2
Projected 2025 Peak Flow Breakdown

Average flow attributed to existing users (includes dry season I/I)	43.5 mgd
Average flow attributed to future users (includes dry season I/I)	15.5 mgd (59.3 – 43.8)
Wet season I/I attributed to existing users	203.2 mgd (220.2 – 17)
Wet season I/I attributed to future users	14.5 mgd (277 – 59.3 – 203.2
Total peak flow	277 mgd
Total peak flow attributed to growth	30 mgd (15.5 + 14.5)

BOD

The methodology for BOD is similar to that of average flow. The existing capacity, although not explicitly stated in the current NPDES permit, is 66,000 lbs/day, which was the value used for the original WPCF design. The current loading or current required capacity in presented in DSMM terms is 54,800 lbs/day and is determined as follows:

Current BOD = (0.185 x 217,737 x 1.3) + 2,402 = 54,800 lbs/day (actual calculated value of 54,756 lbs/day rounded to the nearest hundred pounds).

Where:

- 0.185 is the selected pounds per capita per day (ppcd) based on dry season values from 1990 to 2002
- 217,737 is the population served in 2002
- 1.3 is the selected peaking to convert average dry season load to DSMM load (based on 1990 to 2002 data)
- 2,402 is the current industrial BOD load in lbs/day

The available capacity in terms of BOD is 11,200 lbs/day (66,000 - 54,800).

The projected 2025 average load is determined as follows:

Projected 2025 BOD = (0.185 x 297,585 x 1.3) + 2,402 = 74,000 mgd (actual calculated value of 73,971 lbs/day rounded to the nearest hundred pounds)

Where:

- 0.185 is the selected pounds per capita per day (ppcd) based on dry season values from 1990 to 2002
- 297,585 is the projected population to be served in 2025
- 1.3 is the selected peaking to convert average dry season load to DSMM load (based on 1990 to 2002 data)
- 2,402 is the projected industrial flow in lbs/day (it has been assumed that the industrial load will remain constant over the study period)

The required capacity to meet the needs of growth in terms of BOD is 19,200 lbs/day (74,000 - 54,800).

TSS

The methodology for TSS is identical to that of BOD. The existing capacity, although not explicitly stated in the current NPDES permit, is 71,600 lbs/day, which was the value used for the original WPCF design. The current loading or current required, presented in DSMM terms, is 64,700 lbs/day and is determined as follows:

Current TSS = (0.205 x 217,737 x 1.4) + 2,224 = 64,700 lbs/day (actual calculated value of 64,715 lbs/day rounded to the nearest hundred pounds)

Where:

- 0.205 is the selected pounds per capita per day (ppcd) based on dry season values from 1990 to 2002
- 217,737 is the population served in 2002
- 1.4 is the selected peaking to convert average dry season flow to maximum month dry season flow (based on 1990 to 2002 data)
- 2,224 is the current industrial TSS load in lbs/day

The available capacity in terms of TSS is 6,900 lbs/day (71,600 - 64,700).

The projected 2025 average TSS is determined as follows:

Projected 2025 TSS = (0.205 * 297,585 * 1.4) + 2,224 = 87,600 mgd (actual calculated value of 87,631 lbs/day) rounded to the nearest hundred pounds)

Where:

- 0.205 is the selected pounds per capita per day (ppcd) based on dry season values from 1990 to 2002
- 297,585 is the projected population to be served in 2025

- 1.4 is the selected peaking to convert average dry season load to DSMM load (based on 1990 to 2002 data)
- 2,224 is the projected industrial TSS load in lbs/day (it has been assumed that the industrial load will remain constant over the study period)

The required capacity to meet the needs of growth in terms of TSS is 22,900 lbs/day (87,600 – 64,700).

Biosolids Treatment

The three subcategories used to allocate biosolids treatment, handling, and disposal/reuse costs for purposes of SDC calculations are:

- General
- Dewatering
- Biocycle farm

Table C-3 presents a capacity summary of the MWMC biosolids facilities.

TABLE C-3
Capacity Summary of MWMC Biosolids Facilities (annual average dry tons per year)

	Subcomponents		
	General	**Dewatering**	**Biocycle Farm**
Existing capacity	5,869	7,000	2,811
Current loading (current capacity required)	5,869	5,869	2,811
Available capacity	None	1,131	None
Available capacity (%)	**0%**	**16.2%**	**0%**
Projected 2025 loading (future capacity required)	8,600	7,000	3,612
Growth loading	2,731	1,131	801
Required Capacity Expansion	2,731	None	801
Growth share of 2025 load	**31.8%**	**16.2%**	**22.2%**
Growth share of capacity expansion	**100%**	**0%**	**100%**

The definition and capacity assessment development for these three subcomponents are presented in the following paragraphs.

General

The general subcomponent consists of biosolids thickening and anaerobic digestion at the WPCF; the biosolids pump station/force main system that conveys digested biosolids from the WPCF to the BMF; and facultative sludge storage lagoons and drying beds at the remote

BMF. The majority of the infrastructure associated with this "General" component was constructed in the 1980s and early 1990s.

The current loading or current required capacity is presented as annual average dry tons of digested biosolids.

Current biosolids loading = 4,962 x 1.183 = 5,869 tons per year

Where:

- 4,962 dry tons per year (actual 2002 value)
- 1.183 factor to convert actual value to a value that can be directly compared to the projected 2025 capacity value when a greater biosolids load will be generated by changes in the treatment process, and is calculated as follows:
  - = {(60 x 1.23) + (40 x 1.11)} /100= 1.183
    - Where:
      - 60 is the weighting given to BOD for biosolids production
      - 1.23 is the BOD ppcd ratio (selected/actual) calculated as follows:
        - = 0.185/0.15 = 1.23
        - Where:
          - 0.185 is the selected annual average BOD ppcd for projected influent BOD values
          - 0.15 is the actual BOD ppcd (annual average over 12-year period)
      - 40 is the weighting given to TSS for biosolids production
      - 1.11 is the TSS ppcd ratio (selected/actual) calculated as follows:
        - = 0.233/0.21 = 1.11
        - Where:
          - 0.233 is the selected annual average TSS ppcd for projected influent TSS values (average of dry (0.205) and wet (0.26) seasonal values)
          - 0.21 is the actual TSS ppcd (annual average over 12-year period)

Some existing biosolids facilities in the "general" subcomponent have more than 5,869 dry tons per year of processing capacity while other existing facilities have less. However, in aggregate there is no available capacity and the existing capacity is assumed to be 5,869 dry tons per year as well.

The projected 2025 biosolids is 8,600 dry tons per year on an average annual basis. This value is estimated based on a computer model of the WPCF that predicts biosolids production among many other parameters. The projected biosolids production in 2025 is anticipated to increase at a slightly greater rate than the rate of population growth because of the addition of tertiary filters that will remove additional solids from the wastewater. The additional capacity needed to accommodate growth is 2,731 dry tons per year (8,600 -5,869).

Dewatering

MWMC recently installed mechanical biosolids dewatering at the BMF for the purpose of removing water from the biosolids so that the remaining biosolids volume is reduced. This dewatering facility was designed to accommodate 7,000 dry tons of biosolids on an annual average basis. Therefore, the available capacity is 1,131 (7,000 less 5,869). The additional capacity needed to accommodate growth is 1,131 dry tons per year (7,000 - 5,869).

Biocycle Farm

MWMC is in the process of expanding the capability of the biosolids management program by constructing a poplar plantation or biocycle farm (BF) that can accept non-dewatered biosolids, therefore limiting dependence on the cooperative farms land application program. Phase 1 is currently under construction and is slated to be online spring 2004, and it is assumed that the added flexibility that the Phase 1 BF provides will benefit existing users only. Phase 1 has a capacity to accept 2,811 dry tons per year. For the purpose of determining "available capacity" for the purpose of SDC development, it is assumed that there is no existing available capacity associated with the Phase 1 Biocycle Farm. Phase 2 and 3 will expand the capacity to 3,612 dry tons per year

The additional capacity to meet the needs of growth is 801 dry tons per year (3,612 -2,811)

User Capacity Requirements

Springfield Traffic/ Wastewater Code	BPR/HUD Code	Eugene Wastewater Use Code	Type of Establishment	Flow Estimation Unit (FEU)	Base Flow Impact (gal/FEU/day)	Dry Season Average Flow Impact (gal/FEU/day)	Dry Season Max Month Impact (gal/FEU/day)	Wet Season Peak Flow Impact (gal/FEU/day)
30	4111-4990	4X	TRUCK TERMINAL	TGSF	100	137	205	398
151	6371-6379	63	MINI WAREHOUSE	TGSF	30	41	61	119
170	4111-4990	4X	UTILITIES	TGSF	100	137	205	398
200	1111-1139	1X	OTHER RESIDENTIAL (SFD W/OTHER USES)	DU	175	239	359	696
220	1130-1139	11	OTHER RESIDENTIAL – MUTI FAMILY	DU	150	205	307	597
200	1300	13	OTHER RESIDENTIAL – RESIDENTIAL HOTEL/MOTEL	TGSF	200	273	410	796
240	1400	14	OTHER RESIDENTIAL – MOBILE HOME PARK	DU	150	205	307	597
210	1111-1129	1F	SFD / DUPLEX	DU	175	239	359	696
300	1510-1590	15	MOTEL / HOTEL	TGSF	200	273	410	796
400	7212-7900	7X	PUBLIC PARK	TGSF	160	219	328	636
435		7X	MULTIPURPOSE RECREATION FACILITY (Indoor)	TGSF	160	219	328	636
443	7212-7900	7X	THEATER	TGSF	160	219	328	636
488		7X	OUTDOOR ATHLETIC COMPLEX	TGSF	160	219	328	636
491	7212-7900	7X	TENNIS COURT	TGSF	160	219	328	636
492	7212-7900	7X	RACQUET CLUB	TGSF	160	219	328	636
493	7212-7900	7X	HEALTH CLUB	TGSF	160	219	328	636
494	7212-7900	7X	BOWLING ALLEY	TGSF	160	219	328	636
495	7212-7900	7X	RECREATIONAL CENTER	TGSF	160	219	328	636
500		3X	INDUSTRIAL PROCESS LOW STRENGTH	TGALEF	1000	1,366	2,049	3,978
500		3X	INDUSTRIAL PROCESS MEDIUM STRENGTH	TGALEF	1000	1,366	2,049	3,978
500		3X	INDUSTRIAL PROCESS HIGH STRENGTH	TGALEF	1000	1,366	2,049	3,978
500		3X	INDUSTRIAL PROCESS VERY HIGH STRENGTH	TGALEF	1000	1,366	2,049	3,978
500		3X	INDUSTRIAL PROCESS SUPER HIGH STRENGTH	TGALEF	1000	1,366	2,049	3,978
520	6812	68	ELEMENTARY SCHOOL	TGSF	50	68	102	199
522	522	68	MIDDLE SCHOOL	TGSF	50	68	102	199
530	6813	68	HIGH SCHOOL	TGSF	50	68	102	199
540	6821	68	COMMUNITY COLLEGE	TGSF	50	68	102	199
550	6821	68	UNIVERSITY	TGSF	50	68	102	199
560	6911	69	CHURCH	TGSF	50	68	102	199

565	6811-6839, 7111-7123	68	DAY CARE CENTER	TGSF	50	68	102	199
590	7111	68	LIBRARY	TGSF	50	68	102	199
591	6994	69	FRATERNAL ORGANIZATION	TGSF	50	68	102	199
600	5410-5499	54	SERVICE STATION / MARKET	TGSF	180	246	369	716
610	6511-6519	65	HOSPITAL	TGSF	150	205	307	597
620	6511-6519	65	NURSING HOME	TGSF	150	205	307	597
630	6511-6519	65	CLINIC, MEDICAL OFFICE	TGSF	150	205	307	597
700	5810	5A	FAST FOOD RESTAURANT	TGSF	500	683	1024	1989
720	8221,8222	82	VETRINARIAN SERVICES	TGSF	200	273	410	796
750	6710-6759	67	OFFICE PARK	TGSF	100	137	205	398
770	6710-6759	67	BUSINESS PARK	TGSF	100	137	205	398
730	6710-6759	67	GOVERNMENT BUILDING	TGSF	100	137	205	398
732	6710-6759	67	US POST OFFICE	TGSF	100	137	205	398
800	5910-5999	59	RETAIL	TGSF	50	68	102	199
831	5810	5B	QUALITY RESTAURANT	TGSF	500	683	1024	1989
832	5810	5C	HIGH TURNOVER RESTAURANT	TGSF	500	683	1024	1989
			EATING PLACE WITH MINIMAL FOOD PREPARATION***	TGSF	300	410	615	1,193
835	5820	5D	DRINKING PLACE WITH MINIMAL FOOD PREPARATION****	TGSF	340	464	697	1,353
			DRINKING PLACE WITH RESTAURANT LIKE FOOD PREPARATION	TGSF	500	683	1024	1989
840	6411,6419-6499	64	AUTO CARE	TGSF	40	55	82	159
841	5511-5599	55	NEW CAR SALES	TGSF	50	68	102	199
847	6412	6B	CAR WASH	TGSF	500	683	1,024	1,989
848	5511-5599	55	TIRE STORE	TGSF	50	68	102	199
850	5410-5499	54	SUPERMARKET	TGSF	180	246	369	716
851	5410-5499	54	CONVENIENCE MARKET	TGSF	180	246	369	716
854	5211-5392, 5610-5733	5X	DISCOUNT MARKET	TGSF	30	41	61	119
890	5211-5392, 5610-5733	5X	FURNITURE STORE	TGSF	30	41	61	119
895	7212-7900	7X	VIDEO ARCADE / OTHER ENTERTAINMENT	TGSF	160	219	328	636
900	6111-6133	61	FINANCIAL INSTITUTION	TGSF	110	150	225	438
251	1210-1290	12 B	ELDERLY HOUSING - DETACHED	TGSF	100	137	205	398
252	1210-1290	12A	ELDERLY HOUSING - ATTACHED	TGSF	100	137	205	398
253	1210-1290	12C	CONGREGATE ELDERLY CARE FACILITY	TGSF	100	137	205	398
120	2111-2190	21	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199
120	2220-2395, 2510-2790	2X	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199
120	2400,2421-2499	24	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199
120	2810-3999	3X	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199
120	2810-3999	3X	HEAVY INDUSTRY/INDUSTRIAL/ WHOLESALE**	TGSF	50	68	102	199

710	6141-6190, 6500, 6520-6599, 6810	6X	GENERAL OFFICE BLDG	TGSF	100	137	205	398
860	5111-5199	51	WHOLESALE TRADE	TGSF	50	68	102	199
870	5211-5392	5X	CLOTHING / DRYGOODS / HOUSEWARES	TGSF	30	41	61	119
820	6211-6215	6A	LAUNDRY	TGSF	100	137	205	398
900	6212-6290	62	OTHER SERVICES	TGSF	100	137	205	398
110	6611-6629	66	CONSTRUCTION TRADE	TGSF	100	137	205	398
440	6811-6839	68	OTHER EDUCATIONAL/CULTURAL	TGSF	50	68	102	199
450	7212-7900	7X	OTHER ENTERTAINMENT	TGSF	160	219	328	636
820			SHOPPING CENTER	TGSF	100	137	205	398

ABBREVIATIONS

TGSF - THOUSAND GROSS SQUARE FEET

TSFGLA - THOUSAND SQUARE FEET GROSS LEASABLE AREA

DU - DWELLING UNIT

TGALEF - THOUSAND GALLONS ESTIMATED FLOW

VFP - VEHICLE FUELING POSITIONS

APPENDIX E

GO Bond Credit Calculation

TABLE E-1
GO Bond Credit per $1,000 Assessed Value By Annexation Year

Year of Annexation	by Year	Cumulative Credit (per $1,000 AV)
1979	$0.09	$5.29
1980	$0.07	$5.19
1981	$0.14	$5.12
1982	$0.18	$4.98
1983	$0.17	$4.80
1984	$0.22	$4.63
1985	$0.33	$4.40
1986	$0.40	$4.07
1987	$0.45	$3.67
1988	$0.49	$3.22
1989	$0.48	$2.73
1990	$0.45	$2.25
1991	$0.21	$1.80
1992	$0.15	$1.59
1993	$0.19	$1.45
1994	$0.17	$1.25
1995	$0.16	$1.09
1996	$0.20	$0.92
1997	$0.24	$0.72
1998	$0.20	$0.48
1999	$0.19	$0.28
2000	$0.05	$0.09
2001*	$0.05	$0.05

* Properties annexed subsequent to debt retirement (2001) not eligible for credit.

Metropolitan Wastewater Management Commission
Regional Wastewater SDC Analysis
2017 Project List *(adopted via MWMC Resolution 17-01)*

12/9/2016

Project	Total	Bond Funded	Present Value Interest	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total	Percent Growth	Allocated to Growth
Collection System/Influent Pumping																	
Glenwood Pump Station Upgrade	$926,000					926,000									926,000	38.2%	354,059
River Avenue Improvements	$649,827	$455,923	$192,876												649,827	0.0%	-
Subtotal	$1,575,827	$455,923	$192,876	0	0	926,000	0	0	0	0	0	0	0	0	1,575,827		$354,059
Liquids Treatment																	
Influent PS/Wilakenzie PS/Headworks	$37,707,518	$22,960,320	$9,713,236												37,707,518	38.2%	14,417,580
Primary clarifier enhancements	$3,176,879	$2,054,467	$869,131												3,176,879	64.7%	2,055,627
Primary sludge thickening outside of primary clarifiers	$6,623,134	$5,125,715	$1,497,419												6,623,134	64.7%	4,285,557
Additional odorous air treatment	$10,030,479	$8,596,392	$1,434,087												10,030,479	26.0%	2,612,313
South aeration basin	$12,129,573	$8,484,951	$3,589,511												12,129,573	58.7%	7,122,838
North aeration basin	$16,500,000	$0	$0									500,000	4,000,000	12,000,000	16,500,000	58.7%	9,689,279
Secondary clarifier enhancements	$11,436,767	$7,396,084	$3,128,872												11,436,767	41.6%	4,753,866
9th & 10th secondary clarifier	$6,565,551	$4,245,900	$1,796,204												6,565,551	64.7%	4,248,298
Conversion to sodium hypochlorite disinfection	$6,361,098	$4,413,845	$1,867,253												6,361,098	25.5%	1,621,115
Filtration	$26,328,903	$9,626,336	$2,470,214							4,000,000	10,500,000				26,328,903	41.6%	10,965,140
Peak Flow Mgmt Alternative 2 - High rate clarification	$20,598,470	$13,015,433	$5,506,107												20,598,470	29.4%	6,058,373
New Bankside Outfall	$3,784,334	$2,649,782	$1,120,976												3,784,334	38.2%	1,446,951
Subtotal Liquids Treatment	$161,242,705	$88,569,225	$32,993,009	0	0	0	0	0	0	4,000,000	10,500,000	500,000	4,000,000	12,000,000	161,242,705		$69,276,937
Treatment -- Biosolids																	
WPCF Lagoon Removal/Decommissioning	$4,690,000	$0	$0	390,000	4,300,000										4,690,000	0.0%	-
Waste Activated Sludge Thickening	$0	$0	$0												-		-
Digestion Expansion/Class A Capability	$21,456,899	$12,180,008	$5,152,685	4,124,206											21,456,899	54.3%	11,645,468
Digestion Mixing Improvements	$3,868,106	$2,521,806	$1,066,836												3,868,106	65.9%	2,548,151
Biocycle Farm Phase 2	$379,695	$224,422	$94,940												379,695	22.2%	84,202
Biocycle Farm Phase 3	$438,447	$308,096	$130,338												438,447	22.2%	97,230
Biocyle Farm Hose Reels	$451,402	$166,441	$70,412												451,402	22.2%	100,103
Composting facility	$0	$0	$0												-		-
Biosolids Mgmt Facility (BMF) - Line lagoons 1	$4,592,087	$3,212,326	$1,358,957												4,592,087	0.0%	-
BMF - Line lagoons phase 2	$1,743,560	$1,224,960	$518,213												1,743,560	0.0%	-
BMF - Line lagoons phase 3	$1,455,777	$1,017,418	$430,413												1,455,777	0.0%	-
BMF - Line lagoons phase 4	$1,943,606	$1,365,705	$577,754												1,943,606	0.0%	-
Repairs/Partial Replacement of Biosolids Forcemain	$2,517,975	$1,769,428	$748,547												2,517,975	0.0%	-
Subtotal Biosolids	$43,537,553	$23,990,610	$10,149,094	4,514,206	4,300,000	0	0	0	0	0	0	0	0	0	43,537,553		$14,475,154
Support Facilities																	
Maintenance Facility Improvements	$15,714,304	$1,696,577	$717,727	13,300,000											15,714,304	20.6%	3,237,880
Fiber Optic Wiring	$0	$0	$0												-		-
Subtotal Support	$15,714,304	$1,696,577	$717,727	13,300,000	0	0	0	0	0	0	0	0	0	0	15,714,304		$3,237,880
Total Treatment	$220,494,563	$114,256,412	$43,859,831														
Effluent Reuse	$32,029,793	$1,581,959	$358,834	244,000	472,000	6,338,000	8,296,000	6,739,000	4,000,000	2,000,000	2,000,000				32,029,793	26.1%	8,347,784
Other Projects																	
Temporary Construction Management Facilities	$124,580	$0	$0												124,580	20.6%	25,669
Mixing Zone Study update	$206,951	$145,428	$61,523												206,951	14.6%	30,294
Partial facility plan update (2015)	$287,563	$271,053	$16,510												287,563	20.6%	59,251
Comprehensive facility plan (2019)	$1,693,427	$167,547	$70,880		713,000	742,000									1,693,427	20.6%	348,925
Partial facility plan update (2023)	$350,000	$0	$0							350,000					350,000	20.6%	72,116
Comprehensive facility plan	$1,200,000	$0	$0										600,000	600,000	1,200,000	20.6%	247,256
Wet Weather Flow Management Plan Update	$586,162	$449,986	$136,176												586,162	10.8%	63,483
Support development of private lateral program	$374,000	$0	$0										187,000	187,000	374,000	0.0%	-
Total Other	$4,822,683	$1,034,014	$285,089	$0	$713,000	$742,000	$0	$0	$0	$350,000	$0	$0	$787,000	$787,000	4,822,683		$846,994
Totals	**$258,922,865**	**$117,328,308**	**$44,696,629**	**$18,058,206**	**$5,485,000**	**$8,006,000**	**$8,296,000**	**$6,739,000**	**$4,000,000**	**$6,350,000**	**$12,500,000**	**$500,000**	**$4,787,000**	**$12,787,000**	**$258,922,865**	**37.28%**	**$96,538,808**

METROPOLITAN WASTEWATER MANAGEMENT COMMISSION (MWMC)
REGIONAL WASTEWATER
SYSTEM DEVELOPMENT CHARGE (SDC) SCHEDULE

Metropolitan Wastewater Management Commission

Regional Wastewater SDC Fee Schedule - Effective March 10 2017 March 10, 2017

Springfield Traffic/Wastewater Code	Eugene Wastewater Use Code	Type of Establishment	Flow Estimation Unit (FEU)	Base Flow Impact (gal/FEU/day)	Dry Season Average Flow Impact (gal/FEU/day)	Dry Season Max Month Impact (gal/FEU/day)	Wet Season Peak Flow Impact (gal/FEU/day)	BOD/TSS Strength (mg/l)	Strength	BOD (lbs/FEU/day) *	TSS (lbs/FEU/day) *	Reimburse-ment Cost per FEU	Improve-ment Cost per FEU	Compliance Cost per FEU	Improvement Credit for Rate Support	**Total Cost per FEU**
30	4X	TRUCK TERMINAL	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
151	63	MINI WAREHOUSE	TGSF	30	41	61	119	150	Low	0.051	0.051	$21.12	$311.22	$3.91	$43.17	$293.09
170	4X	UTILITIES	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
200	1X	OTHER RESIDENTIAL (SFD W/OTHER USES)	DU	175	239	359	696	150	Low	0.299	0.299	$123.20	$1,815.47	$22.82	$251.81	$1,709.67
220	11	OTHER RESIDENTIAL - MUTI FAMILY	DU	150	205	307	597	150	Low	0.256	0.256	$105.60	$1,556.12	$19.56	$215.84	$1,465.43
200	13	OTHER RESIDENTIAL - RESIDENTIAL HOTEL/MOTEL	TGSF	200	273	410	796	150	Low	0.342	0.342	$140.79	$2,074.82	$26.09	$287.79	$1,953.91
240	14	OTHER RESIDENTIAL - MOBILE HOME PARK	DU	150	205	307	597	150	Low	0.256	0.256	$105.60	$1,556.12	$19.56	$215.84	$1,465.43
210	1F	SFD / DUPLEX	DU	175	239	359	696	150	Low	0.299	0.299	$123.20	$1,815.47	$22.82	$251.81	$1,709.67
300	15	MOTEL / HOTEL	TGSF	200	273	410	796	300	Medium	0.684	0.684	$233.60	$2,864.96	$36.48	$384.86	$2,750.18
400	7X	PUBLIC PARK	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
435	7X	MULTIPURPOSE RECREATION FACILITY (Indoor)	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
443	7X	THEATER	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
488	7X	OUTDOOR ATHLETIC COMPLEX	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
491	7X	TENNIS COURT	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
492	7X	RACQUET CLUB	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
493	7X	HEALTH CLUB	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
494	7X	BOWLING ALLEY	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
495	7X	RECREATIONAL CENTER	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
500	3X	INDUSTRIAL PROCESS LOW STRENGTH	TGALEF	1000	1,366	2,049	3,978	150	Low	1.710	1.710	$703.97	$10,374.10	$130.43	$1,438.94	$9,769.56
500	3X	INDUSTRIAL PROCESS MEDIUM STRENGTH	TGALEF	1000	1,366	2,049	3,978	300	Medium	3.419	3.419	$1,167.99	$14,324.78	$182.40	$1,924.28	$13,750.90
500	3X	INDUSTRIAL PROCESS HIGH STRENGTH	TGALEF	1000	1,366	2,049	3,978	500	High	5.699	5.699	$1,786.68	$19,592.36	$251.70	$2,571.40	$19,059.34
500	3X	INDUSTRIAL PROCESS VERY HIGH STRENGTH	TGALEF	1000	1,366	2,049	3,978	700	Very High	7.979	7.979	$2,405.37	$24,859.93	$321.00	$3,218.52	$24,367.78
500	3X	INDUSTRIAL PROCESS SUPER HIGH STRENGTH	TGALEF	1000	1,366	2,049	3,978	900	Super High	10.258	10.258	$3,024.06	$30,127.50	$390.31	$3,865.64	$29,676.23
520	68	ELEMENTARY SCHOOL	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
522	68	MIDDLE SCHOOL	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
530	68	HIGH SCHOOL	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
540	68	COMMUNITY COLLEGE	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
550	68	UNIVERSITY	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
560	69	CHURCH	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
565	68	DAY CARE CENTER	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
590	68	LIBRARY	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
591	69	FRATERNAL ORGANIZATION	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
600	54	SERVICE STATION / MARKET	TGSF	180	246	369	716	150	Medium	0.615	0.615	$210.24	$2,578.46	$32.83	$346.37	$2,475.16
610	65	HOSPITAL	TGSF	150	205	307	597	150	Medium	0.513	0.513	$175.20	$2,148.72	$27.36	$288.64	$2,062.63
620	65	NURSING HOME	TGSF	150	205	307	597	150	Low	0.256	0.256	$105.60	$1,556.12	$19.56	$215.84	$1,465.43
630	65	CLINIC, MEDICAL OFFICE	TGSF	150	205	307	597	150	Low	0.256	0.256	$105.60	$1,556.12	$19.56	$215.84	$1,465.43
700	5A	FAST FOOD RESTAURANT	TGSF	**500**	683	1,024	1,989	500	**Very High**	3.989	3.989	$1,202.69	$12,429.97	$160.50	$1,609.26	$12,183.89
720	82	VETERINARIAN SERVICES	TGSF	200	273	410	796	150	Low	0.342	0.342	$140.79	$2,074.82	$26.09	$287.79	$1,953.91
750	67	OFFICE PARK	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
770	67	BUSINESS PARK	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
730	67	GOVERNMENT BUILDING	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
732	67	US POST OFFICE	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
800	59	RETAIL	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
831	5B	QUALITY RESTAURANT	TGSF	**500**	683	1,024	1,989	500	**Very High**	3.989	3.989	$1,202.69	$12,429.97	$160.50	$1,609.26	$12,183.89
832	5C	HIGH TURNOVER RESTAURANT	TGSF	**500**	683	1,024	1,989	500	**Very High**	3.989	3.989	$1,202.69	$12,429.97	$160.50	$1,609.26	$12,183.89
		EATING PLACE WITH MINIMAL FOOD PREPARATION*	**TGSF**	**300**	**410**	**615**	**1,193**	**150**	**Low**	**0.513**	**0.513**	**$211.19**	**$3,112.23**	**$39.13**	**$431.68**	**$2,930.87**
835	**5D**	**DRINKING PLACE WITH MINIMAL FOOD PREPARATION****	**TGSF**	**340**	**464**	**697**	**1,353**	**150**	**Low**	**0.581**	**0.581**	**$239.35**	**$3,527.20**	**$44.34**	**$489.24**	**$3,321.65**
		DRINKING PLACE WITH RESTAURANT LIKE FOOD PREPARATION	**TGSF**	**500**	**683**	**1,024**	**1,989**	**150**	**Very High**	**3.989**	**3.989**	**$1,202.69**	**$12,429.97**	**$160.50**	**$1,609.26**	**$12,183.89**
835	5D	DRINKING PLACE	TGSF	340	464	697	1,353	150	Low	0.581	0.581	$239.35	$3,527.20	$44.34	$489.24	$3,321.65

METROPOLITAN WASTEWATER MANAGEMENT COMMISSION (MWMC)
REGIONAL WASTEWATER
SYSTEM DEVELOPMENT CHARGE (SDC) SCHEDULE

Metropolitan Wastewater Management Commission

Regional Wastewater SDC Fee Schedule - Effective March 10 2017

March 10, 2017

Springfield Traffic/Wastewater Code	Eugene Wastewater Use Code	Type of Establishment	Flow Estimation Unit (FEU)	Base Flow Impact (gal/FEU/day)	Dry Season Average Flow Impact (gal/FEU/day)	Dry Season Max Month Impact (gal/FEU/day)	Wet Season Peak Flow Impact (gal/FEU/day)	BOD/TSS Strength (mg/l)	Strength	BOD (lbs/FEU/day) *	TSS (lbs/FEU/day) *	Reimburse-ment Cost per FEU	Improve-ment Cost per FEU	Compliance Cost per FEU	Improvement Credit for Rate Support	**Total Cost per FEU**
840	64	AUTO CARE	TGSF	40	55	82	159	150	Medium	0.137	0.137	$46.72	$572.99	$7.30	$76.97	$550.04
841	55	NEW CAR SALES	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
847	6B	CAR WASH	TGSF	500	683	1,024	1,989	150	Low	0.855	0.855	$351.99	$5,187.05	$65.21	$719.47	$4,884.78
848	55	TIRE STORE	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
850	54	SUPERMARKET	TGSF	180	246	369	716	300	High	1.026	1.026	$321.60	$3,526.62	$45.31	$462.85	$3,430.68
851	54	CONVENIENCE MARKET	TGSF	180	246	369	716	150	Low	0.308	0.308	$126.72	$1,867.34	$23.48	$259.01	$1,758.52
854	5X	DISCOUNT MARKET	TGSF	30	41	61	119	150	Low	0.051	0.051	$21.12	$311.22	$3.91	$43.17	$293.09
890	5X	FURNITURE STORE	TGSF	30	41	61	119	150	Low	0.051	0.051	$21.12	$311.22	$3.91	$43.17	$293.09
895	7X	VIDEO ARCADE	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
900	61	FINANCIAL INSTITUTION	TGSF	110	150	225	438	150	Low	0.188	0.188	$77.44	$1,141.15	$14.35	$158.28	$1,074.65
251	12 B	ELDERLY HOUSING - DETACHED	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
252	12 A	ELDERLY HOUSING - ATTACHED	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
253	12C	CONGREGATE ELDERLY CARE FACILITY	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
120	21	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
120	2X	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
120	24	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
120	3X	HEAVY INDUSTRY/INDUSTRIAL**	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
120	3X	HEAVY INDUSTRY/INDUSTRIAL	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
710	6X	GENERAL OFFICE BLDG	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
860	51	WHOLESALE TRADE	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
870	5X	CLOTHING / DRYGOODS / HOUSEWARES	TGSF	30	41	61	119	150	Low	0.051	0.051	$21.12	$311.22	$3.91	$43.17	$293.09
820	6A	LAUNDRY	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
900	62	OTHER SERVICES	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
110	66	CONSTRUCTION TRADE	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.40	$1,037.41	$13.04	$143.89	$976.96
440	68	OTHER EDUCATIONAL/CULTURAL	TGSF	50	68	102	199	150	Low	0.085	0.085	$35.20	$518.71	$6.52	$71.95	$488.48
450	7X	OTHER ENTERTAINMENT	TGSF	160	219	328	636	150	Low	0.274	0.274	$112.64	$1,659.86	$20.87	$230.23	$1,563.13
820	Varies	SHOPPING CENTER	TGSF	100	137	205	398	150	Low	0.171	0.171	$70.55	$1,038.96	$13.06	$144.10	$978.48

ABBREVIATIONS

TGSF - THOUSAND GROSS SQUARE FEET
TSFGLA - THOUSAND SQUARE FEET GROSS LEASABLE AREA
DU - DWELLING UNIT
TGALEF - THOUSAND GALLONS ESTIMATED FLOW
VFP - VEHICLE FUELING POSITIONS

NOTES

* Calculated as average flow X 8.345 X strength
** Process flow is in addition to other flow
*** Minimal food preparation - food is assembled from prepackaged food products and cooking, other than warming, is not required
**** Includes coffee houses and juice bars where appropriate